

EE CprE SE 491 - MAY15-28

MicroCART Senior Design Team

Meeting Minutes - Week 5

September 30, 2014

Attendance:

Team Members: (All present)

Paul Gerver
Tyler Kurtz
Joe Benedict
Adam Campbell
Jacob Rigdon
Matt Vitale
Ravi Nagaraju

Advisors: (All Present)

Dr. Phillip Jones
Dr. Nicola Elia

Agenda Items and Discussion

- 1) Table top FPGA board not working
 - Possible UART problem
 - Dr. Jones advised to test it in another lab to verify if it's the board or PC
- 2) PMOD output to the ESCs
 - Bypass power straight to the ESC
 - Send only the ground and signal to PMOD
- 3) Webpage is now open for construction
- 4) 3-axis sensor ready to be integrated with Zybo
 - Register addresses located
 - Need to locate the I2C buss address
 - Need to locate the device address
- 5) Turntable design and construction
 - Holds the quad while testing roll/pitch/yaw control signals
 - Options for 3-axis swivel and 1-axis only (yaw)
 - Dr. Zambrino working with Lee Harker (Joe will help too)
 - Universal design to work with different types of quads

- 6) FPGA on the Zybo is programmable now
 - Loading new programs can be difficult because it can be unstable
 - a) Issue may be related to the particular PC that the program is loaded from
 - Ready to add more features to the terminal program
 - Ready to set-up a Bluetooth to send terminal commands to the Zybo
 - Ready to create PWM module in Zybo software
- 7) Repository is set-up and Adam will hold a GitLab workshop at the next team work session
- 8) Can the new ESCs be calibrated?
 - If so, it was suggested that a calibration code be written so any new /replacement ESC can be quickly calibrated before mounting on the quad
- 9) MATLAB code to parse data from logs is working
 - Parsed Data files have auto-generated file name with time and date
 - Parsed data successfully outputting to plots
- 10) Voltage regulator for Zybo
 - Regulator and safety cut-off to prevent battery damage due to over-draining can be located on the same chip
- 11) Low battery protocol during flight (for the motor power supply)
 - Battery monitor integrated through Zybo to send live status back to ground GUI
 - Source a chip that will read the battery voltage with I2C preloaded
 - Goals is to have a plan to gracefully land the quad when the battery levels are critically low and there isn't time to return to the base station

Deliverables for next week

Ravi

- Talk to Ian McInerney about understanding controls theory for ground rover
- Finalize regulator circuit and create BOM
- Research how to use utilize ECpE server for website

Tyler

- Get PWM signal out of the Zybo board (Work with Jacob and Paul on this)
- Try driving the motor (Work with Jacob and Paul on this)
- Write C code to interface with the terminal and pulse width (Work with Adam on this)
- Record some general characteristics of the ESC/motor/PWM signal response
- Begin researching mixers and look at C implementation (Also, will keep in mind a hardware implementation of the mixer, with later direct connectivity to the PWM's)
- Write brief outline of a generic PID controller in C (later implement PID controllers for throttle, one for pitch, one for yaw, one for roll)

Adam

- Improving the terminal program for the Zybo board
- Serial communication through the Bluetooth MOD adapters

Paul

- Create code to parse data logs from the PID and Omnitrack
- Create the first draft of the team's project plan
- Create tutorial for a "Hello World" application to run on the Zybo (creation, synthesis, and then launch)

Jacob

- Working on a VHDL core to make the Bluetooth module work on the Zybo board

Joe

- Compile Group Task list and update on the drive
- Continue with online controls course via Georgia Institute of Technology
- 3-axis sensor general knowledge and communication with Zybo (Work with Matt)
- Create design file in CAD tool for Zybo adapter
- Cut Zybo adapters on CMC machine and verify fit (redesign if necessary)
- Consult with Lee Harker on the design of a stand for holding quads while testing roll/pitch/yaw controls

Matt

- Attempt to get any response from the 3-axis sensor board